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Wu

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(54) **DOUBLE-WIRE TERMINAL BLOCK STRUCTURE**

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H01R 4/02 (2006.01)
H01R 9/24 (2006.01)
H01R 4/48 (2006.01)

(52) **U.S. Cl.**
CPC ***H01R 9/2416*** (2013.01); ***H01R 9/2491*** (2013.01); *H01R 4/4827* (2013.01); *H01R 4/4836* (2013.01); *H01R 4/4845* (2013.01)

(58) **Field of Classification Search**
CPC . H01R 4/4827; H01R 4/4836; H01R 4/4845
USPC 439/835
See application file for complete search history.

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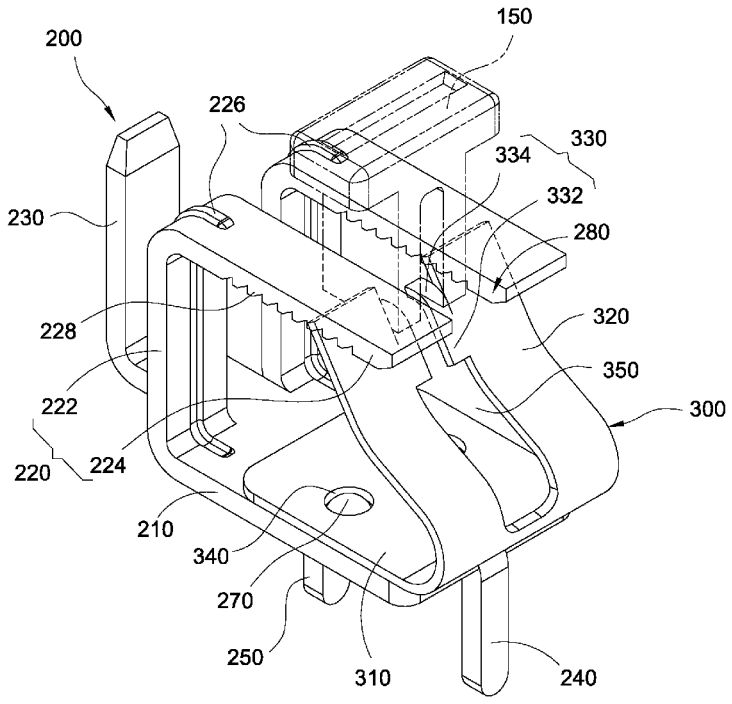
(57) **ABSTRACT**

A double-wire terminal block structure includes an insulation housing, a conductive terminal block, and a clamp terminal block. The insulation housing includes a press hole and a press block movable with respect to the press hole. The conductive terminal block has a base and two extension arms bent and extending from the base. The clamp terminal block includes a base plate positioned on the base, two flexible arms bent from the base plate, and a contact portion connected to each flexible arm. The press block passes through between the two flexible arms to press each contact portion, so that the two flexible arms are resiliently released from contact with the two extension arms to allow wires to be inserted and clamped between the flexible arms and the extension arms. Accordingly, connecting wire can be achieved easily, conveniently, and efficiently.

10 Claims, 6 Drawing Sheets



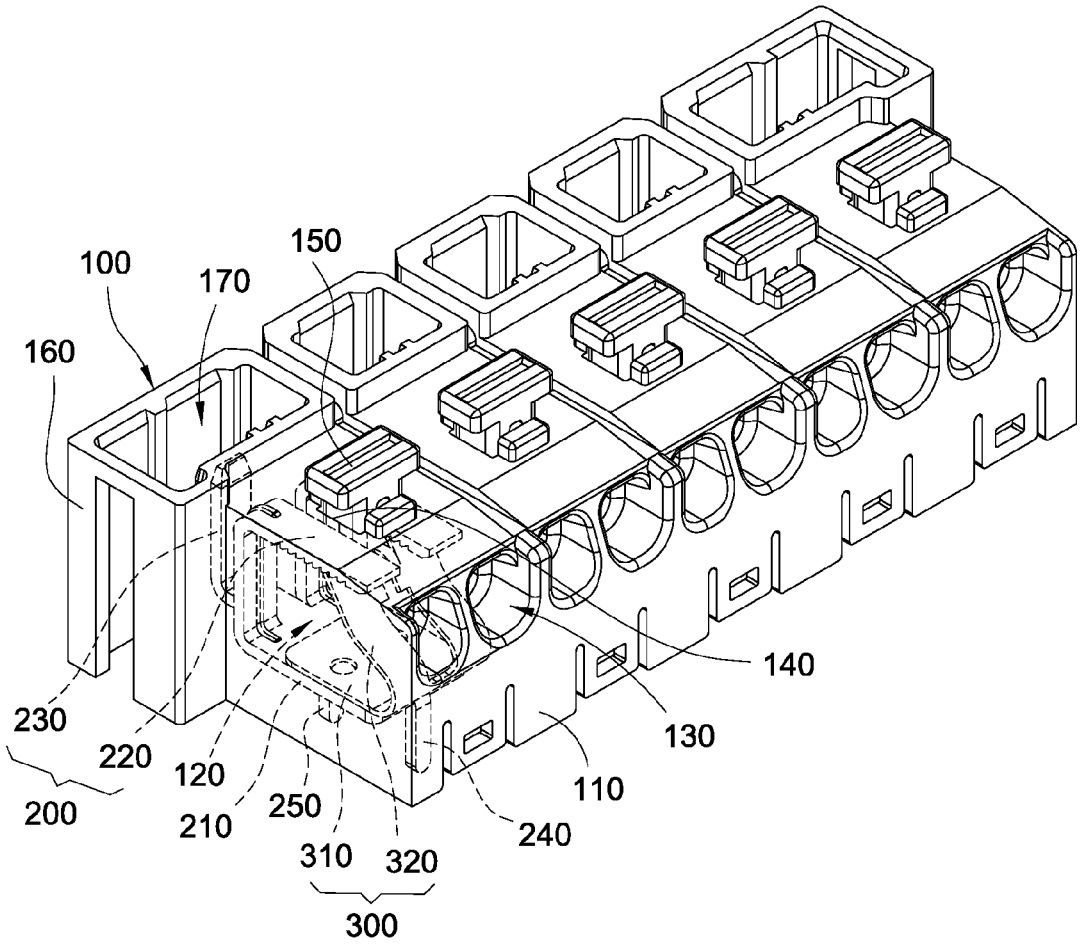

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FIG.1

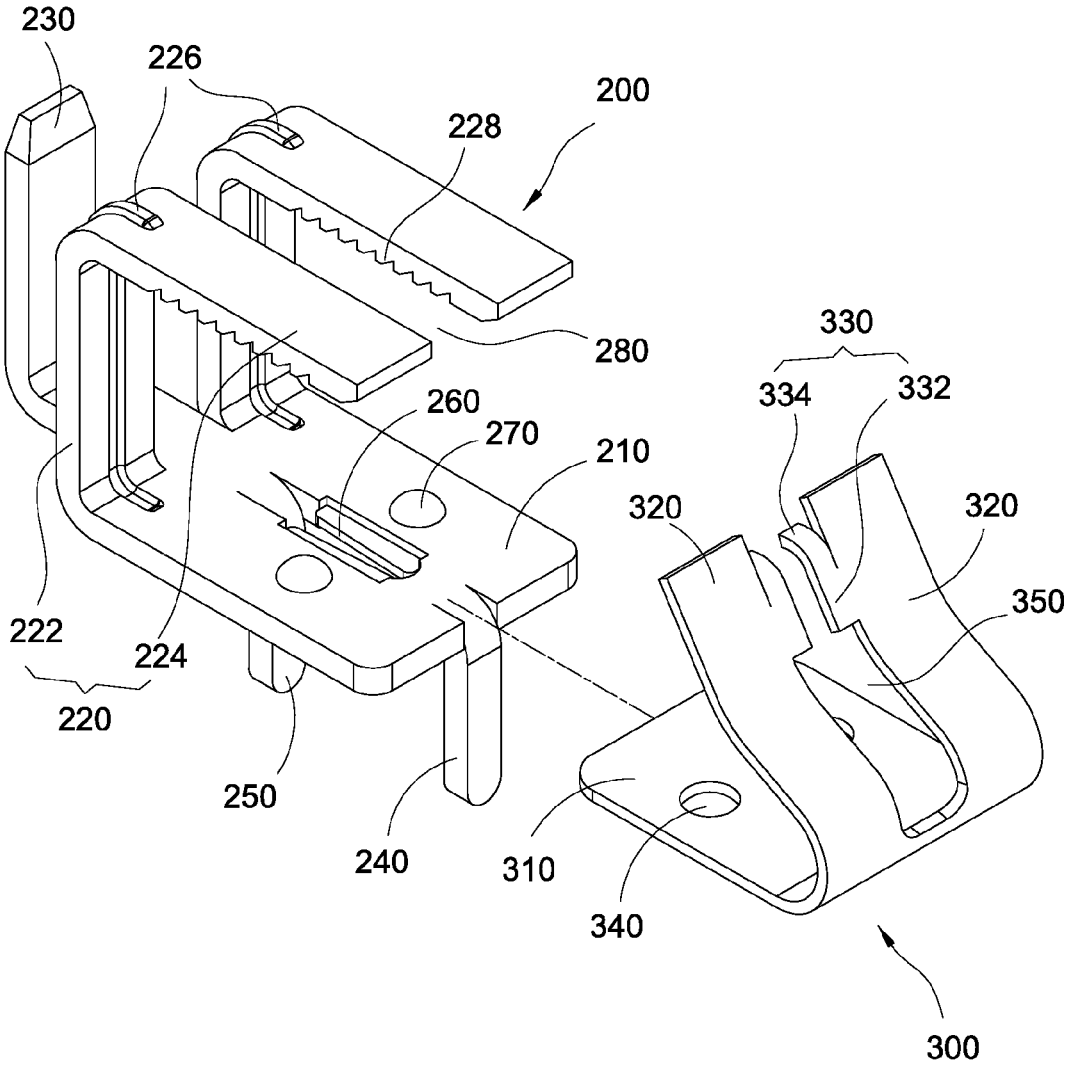
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FIG.2

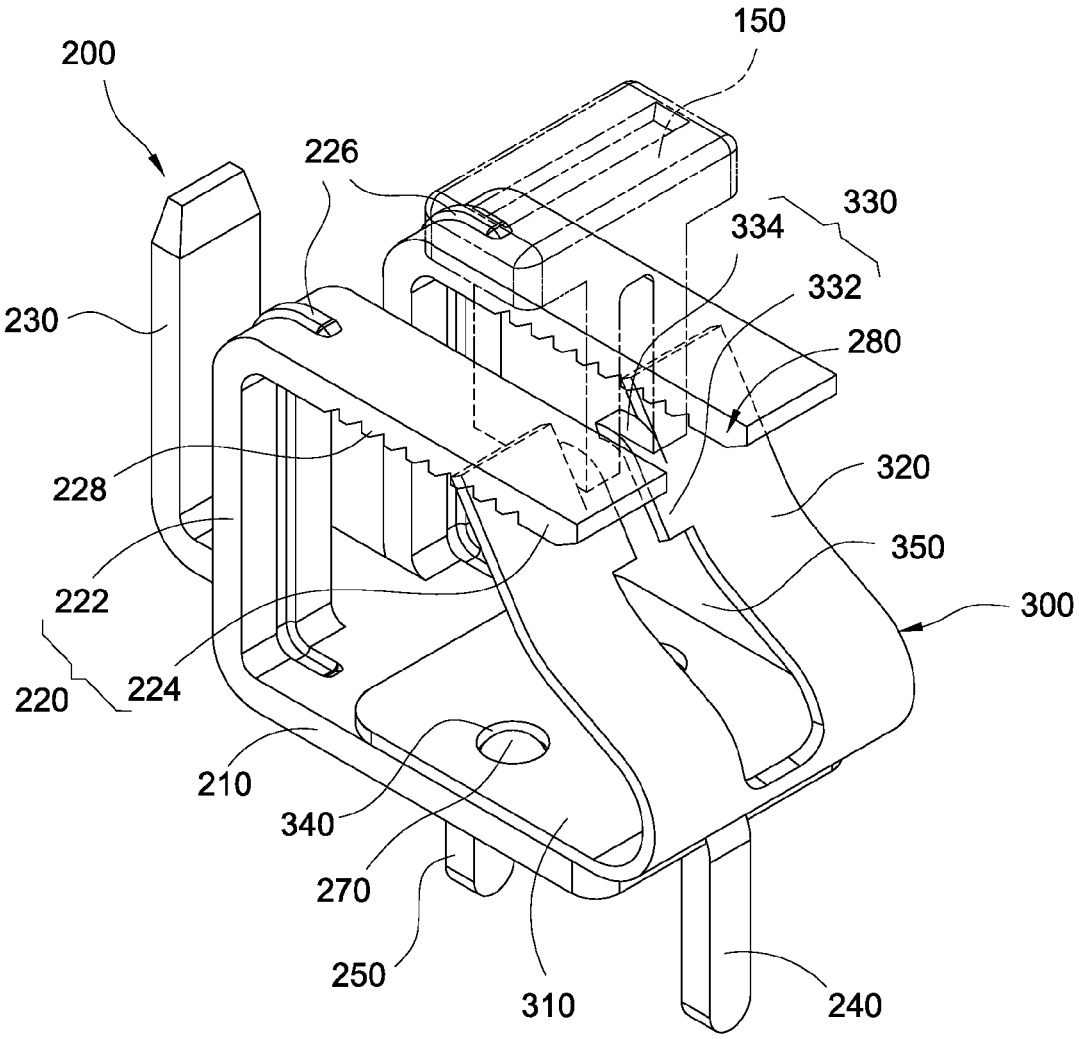
150
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FIG.3

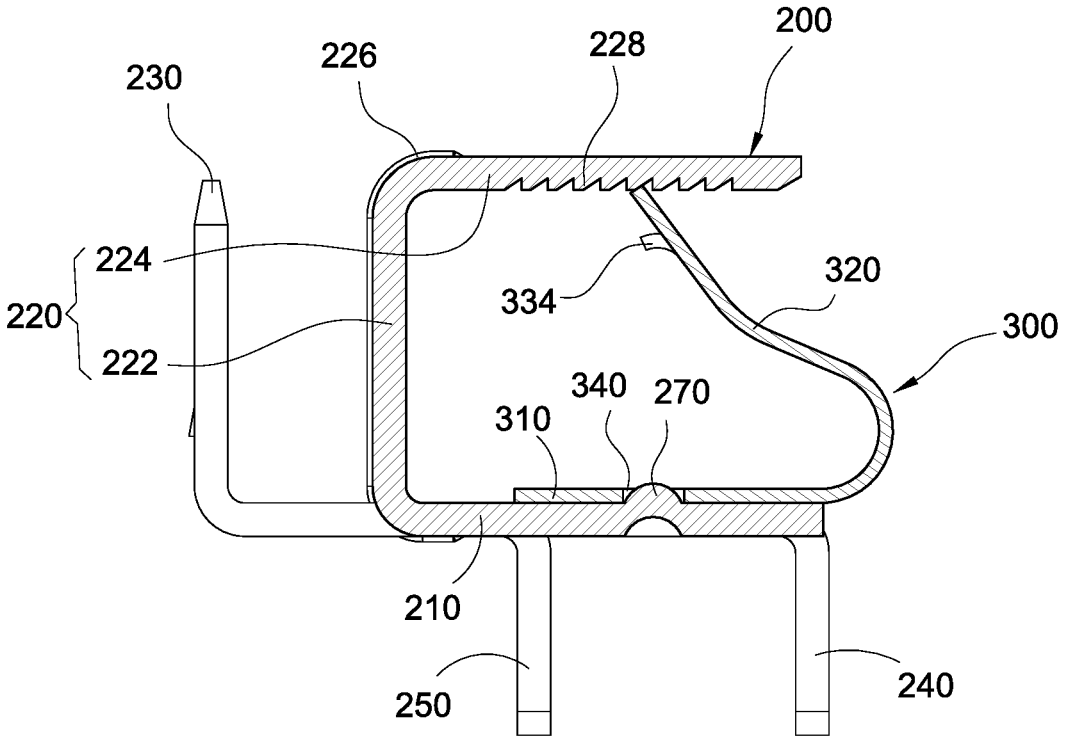
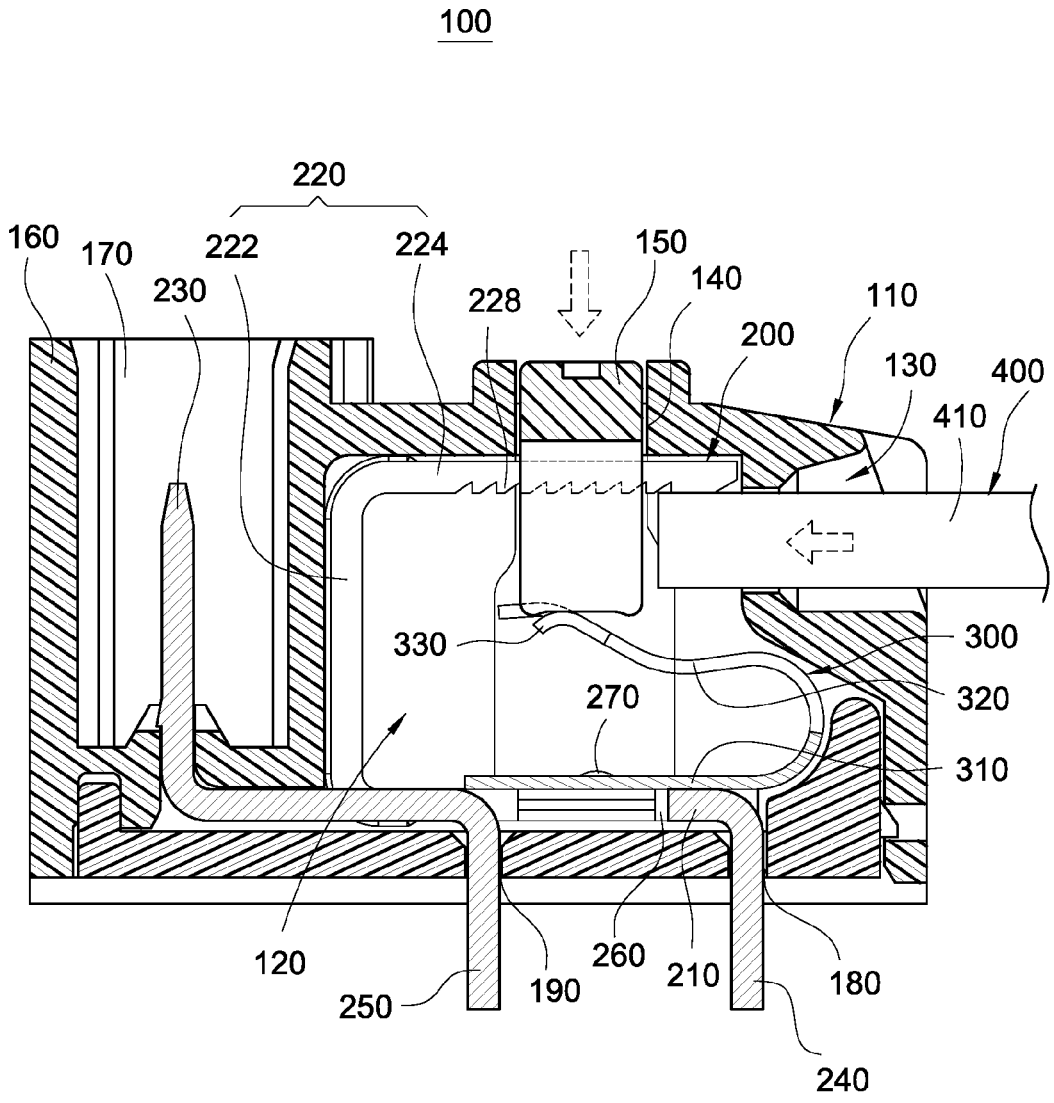


FIG.4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190
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210
180
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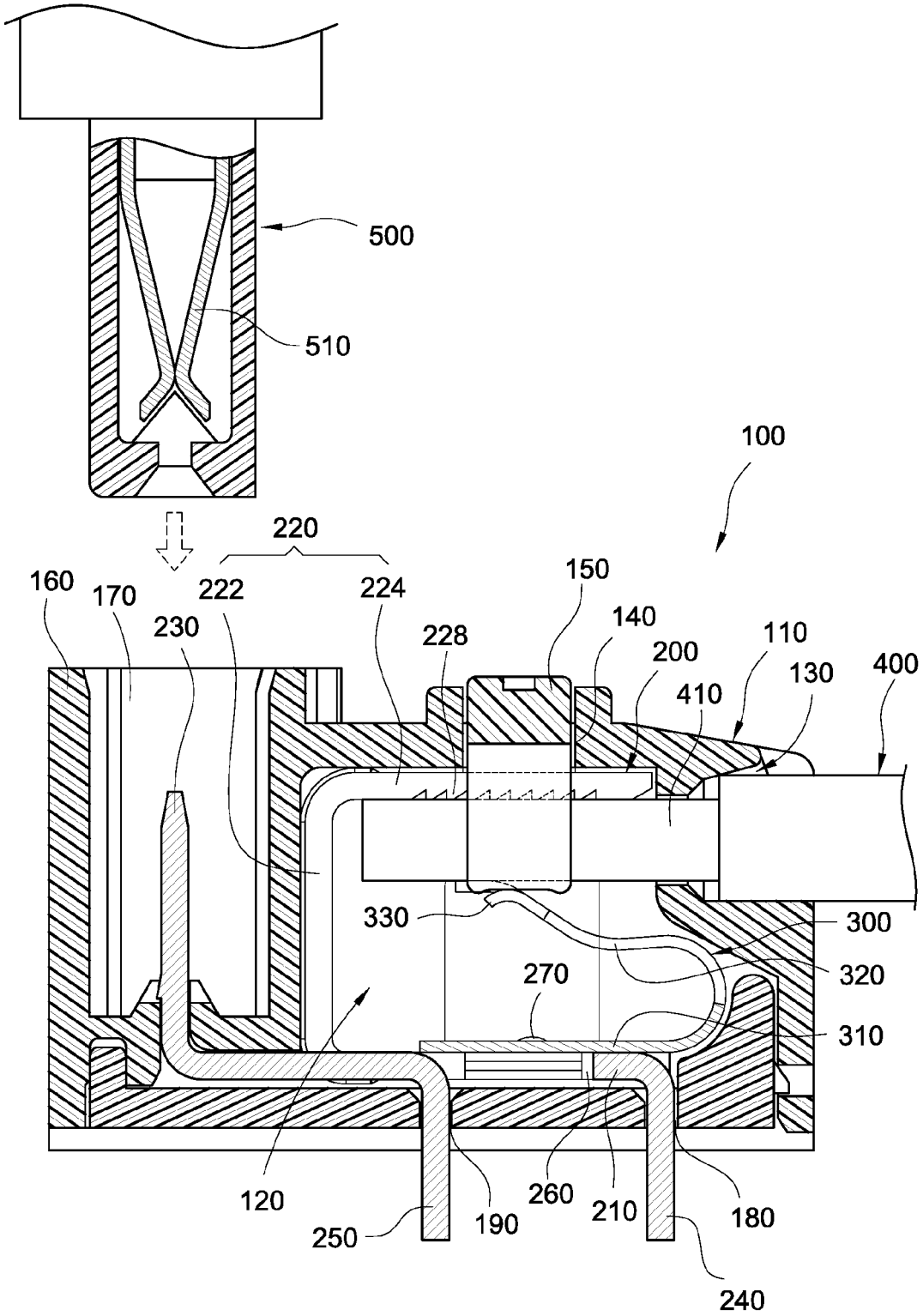
FIG.5


500
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190
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210
180
240

FIG.6

DOUBLE-WIRE TERMINAL BLOCK STRUCTURE

TECHNICAL FIELD

The present invention relates to a terminal block structure and, in particular, to a double-wire terminal block structure capable of connecting two wires at the same time.

BACKGROUND

A terminal block is an electronic component extensively used on various machines for connecting a power line, control line or data transmission line. The terminal block used to connect wires includes a body, an upper base and a lower base. The lower base is disposed in an opening of the body; the upper base is slidably disposed in the opening and is slidable with respect to the lower base. When the upper base slidably moves in the opening to be away from the lower base, the wire can be inserted between the upper base and the lower base in order to be electrically connected.

However, the conventional terminal block does not provide plug connection, so it is necessary to screw-fasten or weld a socket onto the terminal block additionally for a plug to make plug connection to transmit out signal, power or data of the wire. In other words, the conventional terminal block fails to provide the following three functions at the same time, i.e. establishing electrical connection, providing a positioning leg for welded to a circuit board, and providing a socket. Furthermore, in the conventional terminal block, the independent socket is secured to the terminal block by screw-fastening or welding; however, such securement methods tend to cause stability, reliability or other problems with the connection between the socket and the plug.

In addition, the present single terminal block merely connects a single wire, so such application already cannot satisfy the market demands. There is a strong demand to get more wires electrically coupled to the terminal block while achieving the above-mentioned functions and other functions. Accordingly, the inventor made various studies to solve the above-mentioned problems, on the basis of which the present invention is achieved.

SUMMARY

It is an object of the present invention to provide a double-wire terminal block structure, whereby wires can be connected in a more convenient, time-saving, and efficient way.

It is another object of the present invention to provide a double-wire terminal block structure having a socket and an insulation housing which are integrally formed.

Accordingly, the present invention provides a double-wire terminal block structure, comprising an insulation housing, a conductive terminal block, and a clamp terminal block. The insulation housing includes an accommodating trough, two wiring holes, a press hole, a press block movable with respect to the press hole, and a socket adjacent to the accommodating trough. The accommodating trough communicates with the two wiring holes and the press hole. The conductive terminal block includes a base positioned at the bottom of the accommodating trough, two extension arms bent and extending from the base, and an insertion lead extending from between the two extension arms toward the socket. The clamp terminal block includes a base plate positioned at the base, two flexible arms bent and extending from the base plate, and a contact portion connected to an inner side of one end of each of the flexible arms, wherein the press block passes through between the two extension arms to press each of the contact portions to resiliently release the two flexible arms from contact with the two extension arms.

It is preferable that the base further includes two positioning portions protruding therefrom and includes an aperture between the two positioning portions, the base plate includes two openings corresponding to the two positioning portions, and the positioning portions are engaged with the openings respectively.

It is preferable that each of the extension arms further includes an upright section and a horizontal section connected to the upright section, and the horizontal section is disposed horizontally in parallel relation to the base.

It is preferable that each of the contact portions further includes a fixed portion connected to an inner side edge of the flexible arm and includes a bending portion connected to one end of the fixed portion, and the bending portion is bent toward the insertion lead.

The present invention further has the following effects. The insertion lead, the first leg and the second leg of the conductive terminal block are produced by press molding the base directly, so multiple functions can be achieved, such as electrically coupling the connection plug to the insertion lead in the socket, and using the first leg and the second leg to facilitate welding to the circuit board (not illustrated). Each contact portion of the clamp terminal block is formed by press molding each flexible arm to become a split structure for being pressed by the press block. Therefore, by utilizing the press-molded conductive terminal block and the clamp terminal block, the present invention greatly saves a material cost and reduces the component number, and thereby assembly is convenient, time-saving, and efficient.

BRIEF DESCRIPTION OF THE DRAWINGS

The disclosure will become more fully understood from the detailed description, and the drawings given herein below are for illustration only, and thus does not limit the disclosure, wherein:

FIG. **1** is a perspective view of the present invention, showing multiple double-wire terminal block structures arranged in parallel;

FIG. **2** is a perspective exploded view of the present invention, showing a conductive terminal block and a clamp terminal block;

FIG. **3** is a schematic view of the present invention, showing the conductive terminal block and the clamp terminal block assembled together;

FIG. **4** is a cross-sectional view of the present invention, showing the conductive terminal block and the clamp terminal block;

FIG. **5** is a cross-sectional view of the present invention, showing pressing down a press block to separate a flexible arm from an extension arm; and

FIG. **6** is a cross-sectional view of the present invention, showing the clamp terminal block clamping a wire on the conductive terminal block, and showing a connection plug for coupled with a socket.

DETAILED DESCRIPTION

Detailed descriptions and technical contents of the present invention are illustrated below in conjunction with the accompany drawings. However, it is to be understood that the descriptions and the accompany drawings disclosed

herein are merely illustrative and exemplary and not intended to limit the scope of the present invention.

Referring to FIGS. **1** to **6**, the present invention provides a double-wire terminal block structure **100** for electrically coupled to two wires **400** and transmitting data, signals or power by connecting a connection plug **500** having a pair of connection terminals **510**. According to the embodiment shown in FIG. **1**, it is preferable to use a plurality of double-wire terminal block structures **100** arranged in parallel; the quantity varies depending on requirement. For the purpose of simplicity, only one double-wire terminal block structure **100** is described hereinafter as an example.

As shown in FIG. **1**, the double-wire terminal block structure **100** includes an insulation housing **110**, a conductive terminal block **200**, and a clamp terminal block **300**. The insulation housing **110** includes an accommodating trough **120**, two wiring holes **130**, a press hole **140**, a press block **150** movable with respect to the press hole **140**, and a socket **160** adjacent to the accommodating trough **120**. The accommodating trough **120** communicates with the two wiring holes **130** and the press hole **140**. In the present embodiment, the socket **160** further includes an insertion hole **170**, the insertion hole **170** and the press hole **140** are open at the top of the insulation housing **110**, and the socket **160** is disposed at the other side of the insulation housing **110** opposite to the two wiring holes **130**.

Referring to FIGS. **2** to **4**, the conductive terminal block **200**, preferably made of metal or alloy thereof, includes a base **210** positioned at the bottom of the accommodating trough **120**, two extension arms **220** bent and extending from the base **210**, and an insertion lead **230** extending from between the two extension arms **220** toward and preferably into the socket **160**. The clamp terminal block **300**, preferably made of metal or alloy thereof, includes a base plate **310** positioned at the base **210**, two flexible arms **320** bent and extending from the base plate **310**, and a contact portion **330** connected to an inner side of one end of each of the flexible arms **320**.

The base **210** further includes two positioning portions **270** and an aperture **260** between the two positioning portions **270**. The base plate **310** includes two openings **340** corresponding to the two positioning portions **270**, the positioning portions **270** are engaged with the openings **340** respectively, so the base plate **310** of the clamp terminal block **300** can be stably positioned on the base **210** of the conductive terminal block **200**. In the present embodiment, it is preferable that the two positioning portions **270** are of round shape, and the two openings **340** are correspondingly circular shaped. However, in other embodiments, the positioning portions **270** and the openings **340** can be oval or triangle shaped, or in other suitable shape; the present invention is not limited in this regard.

Each of the extension arms **220** further includes an upright section **222** and a horizontal section **224** connected to the upright section **222**. The horizontal section **224** is disposed horizontally in parallel relation to the base **210**. An inner surface of each of the horizontal sections **224** further includes a plurality of teeth **228** to enhance a clamping force applied to the wire (not illustrated). An outer surface of each of the upright sections **222** further includes a rib **226** to enhance structural strength of the extension arm **220** and also enhance whole supporting strength of the insulation housing **110**.

Furthermore, the contact portion **330** further includes a fixed portion **332** connected to an inner side edge of the flexible arm **320** and includes a bending portion **334** connected to the fixed portion **332**; the bending portion **334** is bent toward the insertion lead **230**. As shown in FIGS. **2** and **3**, a first gap **280** is provided between the two extension arms **220**, a second gap **350** is provided between the two flexible arms **320**, and the first gap **280** and the second gap **350** are disposed corresponding to each other. The insertion lead **230** extends from a direction of the first gap **280**. As shown in the drawings, the press block **150** passes through the first gap **280** between the two extension arms **220** to press each contact portion **330**, so that the two flexible arms **320** are resiliently released from contact with the two extension arms **220**, as also referring to FIGS. **5** and **6**.

The conductive terminal block **200** further includes a first leg **240** and a second leg **250** bent and extending from the base **210**. The first leg **240** and the second leg **250** are disposed corresponding and parallel to each other for welded to a circuit board (not illustrated). One side of the insulation housing **110** opposite to the press hole **140** includes a first positioning hole **180** and a second positioning hole **190**. As shown in FIGS. **5** and **6**, the first leg **240** is vertically inserted, from one end of the base **210**, into the first positioning hole **180** to be positioned therein, one end of the second leg **250** is vertically connected to the base **210**, and the other end of the second leg **250** is bent away from the aperture **260** and positioned in the second positioning hole **190**.

As shown in FIG. **5**, the press block **150** of the insulation housing **110** is movable in the press hole **140**, the movement direction of the press block **150** being perpendicular to a direction of inserting the two wires **400** into the two wiring holes **130**. The two wires **400** are clamped between the two flexible arms **320** and the two extension arms **220**, so data, signal or power of the two wires **400** can be transmitted to the insertion lead **230**. The insertion lead **230** is bent and extends from between two extension arms **220** toward the socket **160** and is parallel to the first leg **240** and the second leg **250**.

When the press block **150** movably presses each contact portion **330** in the press hole **140**, the two flexible arms **320** resiliently move away from the two extension arms **220**. At this point, the wire **400** having a core **410** is inserted in from the wiring hole **130**. After the press block **150** is released, the two flexible arms **320** return resiliently to clamp the core **410**, so the wire **400** is secured tightly and is electrically connected between the flexible arm **320** and the extension arm **220**, as shown in FIG. **6**.

The embodiment shown in FIG. **6** further includes a connection plug **500** having a pair of connection terminals **510** for being inserted into the insertion hole **170** of the socket **160**, so that the insertion lead **230** is electrically coupled to the two connection terminals **510**, so as to transmit the data, signal or power of the wire **400** via the connection plug **500** to an electronic device (not illustrated) connected thereto.

In the present invention, the two flexible arms **320** are pressed down at the same time by pressing the press block **150**, so connecting the two wires **400** can be achieved in a much more convenient, time-saving, and efficient way. Furthermore, in the present invention, the insertion lead **230**, the first leg **240** and the second leg **250** of the conductive terminal block **200** are produced by press molding the base **210** directly, so multiple functions can be achieved, such as electrically coupling the connection plug **500** to the insertion lead **230** in the socket **160**, and using the first leg **240** and the second leg **250** to facilitate welding to the circuit board (not illustrated). Each contact portion **330** of the clamp terminal block **300** is produced by press molding each flexible arm **320** to become a split structure for being pressed

by the press block **150**. Therefore, by utilizing the press-molded conductive terminal block **200** and the clamp terminal block **300**, the present invention greatly saves a material cost and reduces the component number, and thereby assembly is convenient, time-saving, and efficient.

It is to be understood that the above descriptions are merely the preferable embodiments of the present invention and are not intended to limit the scope of the present invention. Equivalent changes and modifications made in the spirit of the present invention are regarded as falling within the scope of the present invention.

What is claimed is:

1. A double-wire terminal block structure, comprising:

an insulation housing, the insulation housing including an accommodating trough, two wiring holes, a press hole, a press block movable with respect to the press hole, and a socket adjacent to the accommodating trough, the accommodating trough communicating with the two wiring holes and the press hole;

a conductive terminal block, the conductive terminal block including a base positioned at a bottom of the accommodating trough, two extension arms bent and extending from the base, and an insertion lead extending from between the two extension arms toward the socket; and

a clamp terminal block, the clamp terminal block including a base plate positioned at the base, two flexible arms bent and extending from the base plate, and a contact portion connected to an inner side of one end of each of the flexible arms, wherein the press block passes through between the two extension arms to press each of the contact portions to resiliently release the two flexible arms from contact with the two extension arms.

2. The double-wire terminal block structure of claim **1**, wherein the base further includes two positioning portions protruding therefrom and includes an aperture between the two positioning portions, the base plate includes two openings corresponding to the two positioning portions, and the positioning portions are engaged with the openings respectively.

3. The double-wire terminal block structure of claim **1**, wherein each of the extension arms further includes an upright section and a horizontal section connected to the upright section, and the horizontal section is disposed horizontally in parallel relation to the base.

4. The double-wire terminal block structure of claim **1**, wherein each of the contact portions further includes a fixed portion connected to an inner side edge of the flexible arm and includes a bending portion connected to one end of the fixed portion, and the bending portion is bent toward the insertion lead.

5. The double-wire terminal block structure of claim **1**, wherein a movement direction of the press block in the press hole is perpendicular to a direction of inserting two wires into the two wiring holes, and each of the two wires is clamped between each of the two flexible arms and each of the two extension arms.

6. The double-wire terminal block structure of claim **2**, wherein the conductive terminal block further includes a first leg and a second leg bent and extending from the base, and the first leg and the second leg are disposed corresponding and parallel to each other.

7. The double-wire terminal block structure of claim **3**, wherein an inner surface of each of the horizontal sections further includes a plurality of teeth.

8. The double-wire terminal block structure of claim **6**, wherein one side of the insulation housing opposite to the press hole includes a first positioning hole and a second positioning hole.

9. The double-wire terminal block structure of claim **8**, wherein the first leg is vertically inserted, from one end of the base, into the first positioning hole to be positioned therein, one end of the second leg is vertically connected to the base, and the other end of the second leg is bent away from the aperture and positioned in the second positioning hole.

10. The double-wire terminal block structure of claim **1**, wherein a first gap is provided between the two extension arms, a second gap is provided between the two flexible arms, and the first gap and the second gap are disposed corresponding to each other.

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